5. SINGLE REPOSITORY FOR THE NATION'S NUCLEAR WASTE

As mandated by the Nuclear Waste Policy Act, the first repository will be allowed to dispose of 70,000 MTHM or equivalent of spent fuel and high-level waste. This represents only a portion of the Nation's projected total nuclear waste inventory that will require eventual disposal. Should new legislation be introduced to remove the capacity limitation of 70,000 MTHM, current repository designs can be modified to accommodate all of the Nation's projected nuclear waste inventory.

This section examines the implications of receiving and disposing of all of the Nation's projected nuclear waste inventory in a single repository. The information presented is gleaned from a total system life cycle cost (TSLCC) analysis of the waste management program (DOE 1998c), and its companion assumptions document (M&O 1998). For the purpose of the TSLCC analysis, the Yucca Mountain site serves as a surrogate for a single repository system.

5.1 MAJOR ASSUMPTIONS FOR A SINGLE REPOSITORY

The major assumptions made in the TSLCC analysis include the following:

1) The total amount of commercial spent fuel to be received at the repository is approximately 86,300 MTHM. This includes about 700 MTHM of mixed oxide spent fuel.

2) The total amount of DOE spent fuel to be received is approximately 2,570 MTHM. This includes 63 MTHM of Naval spent fuel. The DOE spent fuel wil be delivered in about 3,857 canisters, including 300 canisters of Naval spent fuel.

3) The number of high-level waste canisters to be received is approximately 20,000. This includes about 635 canisters containing both immobilized plutonium and high-level waste. The waste canisters will be generated at the following sites in the amounts indicated:

   Hanford Site - 12,444 high-level waste canisters
   Idaho National Engineering and Environmental Laboratory - 1,190 high-level waste canisters
   Savannah River Site - 5,385 high-level waste canisters and 635 immobilized plutonium and high-level waste canisters
   West Valley Demonstration Project - 276 high-level waste canisters
   Argonne National Laboratory West - 71 high-level waste canisters

4) Commercial spent fuel pickup is in accordance with the Oldest Fuel First/Annual Priority Ranking (OFF/APR) allocation methdology.

5) Initial receipt rates for DOE spent fuel and high-level waste are low until 2015.

Because the TSLCC analysis uses an independent database which is continually updated, the projected amounts of wastes shown above differ slightly from those indicated in Section 2.

5.2 WASTE RECEIPT RATES AT THE SINGLE REPOSITORY

Tables 10, 11 and 12 show the amount of commercial spent fuel (including mixed oxide spent fuel), DOE spent fuel (including Naval spent fuel), and high-level waste (including immobilized plutonium), respectively, that will be received at the single repository. It is assumed that receipt of spent fuel and high-level waste begins in 2010.

Table 10. Commercial Spent Fuel Receipt Rates at the Single Repository
(In MTHM Per Year)

Year	Receipt Rate
2010 (partial year)	400
2011	600
2012	1,200
2013	2,000
2014	3,000
2015 – 2040	3,000
2041	1,117
Total	86,317

Table 11. DOE Spent Fuel Receipt Rates at the Single Repository
(In Canisters Per Year)

Year	Receipt Rate
2010	1
2011	1
2012	3
2013	6
2014	8
2015	109
2016	150
2017	116
2018	206
2019	172
2020	200
2021	204
2022	144
2023	141
2024	161
2025	232
2026	237
2027	229
2028	236

2029	253
2030	250
2031	253
2032	248
2033	138
2034	100
2035	59
Total	3,857

Table 12. High-Level Waste Receipt Rates at the Single Repository
(In Canisters Per Year)

Year	Receipt Rate
2010 – 2014	150
2015	355
2016	376
2017 – 2018	430
2019	420
2020 – 2025	395
2026 – 2028	375
2029 – 2031	455
2032	450
2033	255
2034 – 2035	1,475
2036	1,471
2037 – 2040	1,450
2041	1,457
Total	20,004

5.3 IMPLICATIONS OF A SINGLE REPOSITORY

All of the Nation's projected nuclear waste inventory can be emplaced in a single repository at the proposed Yucca Mountain site by 2041. Of particular significance is that all of the DOE spent fuel (including Naval spent fuel) would be emplaced by 2035, thereby complying with an existing DOE/Navy/State of Idaho Settlement Agreement that stipulates that all DOE spent fuel at the Idaho National Engineering and Environmental Laboratory must be removed from Idaho by 2035.

Although the repository would have to remain operational for an additional eight years than currently planned, it obviates the need to site, characterize, license, construct, and operate a second repository as required by current law.